REMARKS

After entry of this amendment, claims 1, 3, 6-9, 11, 14-17, 19-20, 23, and 25-27 are pending. Claims 2, 10, 12 and 13 have been cancelled without prejudice or disclaimer. Claims have been amended without prejudice or disclaimer and find support *inter alia* in the original claims. Claim 1 finds further support in the specification at page 1, lines 5-10, and page 10, lines 27-33. No new matter has been added. Applicants respectfully request entry of the above claim amendment as it is believed to put the claims in condition for allowance or, alternatively, in better form for consideration on appeal. Thus, entry under 37 CFR §1.116 is correct.

Clam Rejection – 35 U.S.C. § 112

Claims 1, 6-11, 14-17, 19-20 and 26-27 are rejected under 35 U.S.C. § 112 as for lack of enablement. The Examiner alleges that the specification does not provide any evidence showing that resistance to biotic and all abiotic stresses can be improved using the exemplified and non-exemplified nucleic acid sequences. The Examiner further asserts that, although the specification discloses transgenic plants expressing BI1 sequences and having resistance to various plant pathogens, the specification does not disclose any transgenic plant having resistance to any abiotic stress recited in the claims. Office Action at pages 2-3. Applicants respectfully disagree. However, to expedite prosecution, claim 1 has been amended without prejudice or disclaimer to specify resistance to a plant pathogen. As the Examiner acknowledged at page 3 of the Office Action, the specification discloses transgenic plants expressing BI1 sequences and having resistance to various plant pathogens. Accordingly, it is respectfully submitted that the present claim amendment overcomes the rejection.

Furthermore, as discussed in the specification and in the Response dated November 1, 2007, BI1 is a highly conserved protein. See Specification at page 3, line 29. Motifs which are conserved between various BI1 proteins of different origins can be identified easily by sequence alignment as demonstrated in Figures 1 and 6 of the present application using mathematical algorithms such as GAP, as described in the specification, or BLAST and CLUSTALW, as well known in the art at the time of filing. Accordingly, when preparing a BI1 protein for the use of the claimed method, one skilled in the art would find guidance based on the sequence alignment and investigate mutations such as modifications, substitutions, or deletions of amino acid residues that are least likely to impair function. One skilled in the art would be able to easily

identify a sequence that is within the scope of the claims. Because methods of generating such mutations, for example, site-direct mutagenesis and PCR-mediated mutagenesis, and screening such mutants for activity are standard techniques readily available and known to those skilled in the art, no undue experimentation would be required to make and use the claimed subject matter.

In view of the detailed description, guidance, working examples, and high level of skill, the specification enables the full scope of the claims as amended without undue experimentation. On these facts, an analysis under *In re Wands* supports enablement. *In re Wands*, 858 F.2d 731, 737 (Fed. Cir. 1988). It is further noted that the above analysis is also in consistent with the Board's decision in *Ex parte Kubin*, 83 USPQ2d 1410 (B.P.A.I. 2007), where the Board noted that, even though practicing the full scope of the claims might have required extensive experimentation, the experimental techniques were well-known in the art, so the experimentation would have been routine and thus, not undue. *Id.* at 1416. In this case, the required experimentation would not be extensive and is routine in nature.

For at least the above reasons and in light of the present amendment, it is respectfully submitted that the claims recite a scope of subject matter which a skilled artisan could clearly make and use according to the teaching in the specification. Reconsideration and withdrawal of this rejection is therefore respectfully requested.

Clam Rejection – 35 U.S.C. § 103

Claims 1-3, 6-11, 14-17, 19-20, 23, and 25-27 are rejected under 35 U.S.C. § 103(a) as being obvious over Simmons *et al.* (hereinafter "Simmons") in view of Hückelhoven *et al.* (hereinafter "Hückelhoven"). The Examiner alleges that the transgenic plants taught in Simmons expressing BI1 protein in the roots, flowers or seeds tissues are expected to possess unaltered BI1 activity/protein in leaf epidermis. Office Action at page 5. The Examiner further asserts that, since the rejection is one of obviousness and not one of anticipation, none of the cited references need teach BI1 gene is unchanged or reduced in leaf epidermis or teach the use of a tuber or a mesophyll-specific promoter with the BI1 gene to transform a plant. Office Action at page 6. Applicants respectfully disagree. However, to expedite prosecution, claim 1 has been amended without prejudice or disclaimer to specify the expression profile of the at least one BI1 protein in the transgenic plant with more specificity. Reconsideration and withdrawal of the rejection is respectfully requested in light of the present claim amendment and further in view of

the following reasons.

The Examiner bears the initial burden of establishing *prima facie* obviousness. *See In re Rijckaert*, 9 F.3d 1531, 1532, 28 USPQ2d 1955, 1956 (Fed. Cir. 1993). To support a *prima facie* conclusion of obviousness, the prior art must disclose or suggest all the limitations of the claimed invention. *See In re Lowry*, 32 F.3d 1579, 1582, 32 USPQ2d 1031, 1034 (Fed. Cir. 1994). Additionally, all words in a claim must be considered in judging the patentability of that claim against the prior art. *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970); see also MPEP § 2143.03.

As amended, claim 1 recites that the expression of the at least one BI1 protein remains essentially unchanged or is reduced in the leaf epidermis of the transgenic plant, while the expression in the mesophyll of the same plant is increased. As discussed in the Response dated August 7, 2008, Simmons discloses BI genes from corn and soybean. Simmons further discloses methods of using these BI sequences in generating transgenic plants and in improving disease and stress resistance. Simmons teaches several types of promoters such as constitutive promoters, stress-inducible promoters, and promoters for expression in specific parts of the plants (e.g. leaves, roots, fruits, seeds, or flowers) may be used to overexpress BI genes. Simmons, however, does not disclose or suggest generating or increasing resistance to a plant pathogen by maintaining the expression of the BI1 gene essentially unchanged or reduced in the leaf epidermis while overexpressing the BI gene in the mesophyll of a transgenic plant.

Hückelhoven does not remedy this deficiency. Hückelhoven discloses a nucleic acid encoding a BI1 protein that is 100% identical to SEQ ID NO: 2. Although it is shown that this barley BI1 gene was up-regulated in barley leaves in response to *Blumeria graminis* f.sp. *hordei* (*Bgh*) inoculation (see Hückelhoven at page 743, right Col. and page 745, Figure 5), Hückelhoven is also silent with regard to generating or increasing resistance to a plant pathogen by manipulating the expression level of the barley BI1 gene in the epidermis and mesophyll of a plant.

It follows that the combination of Simmons and Hückelhoven does not render the present invention obvious because the combined teaching does not teach or suggest a method of using a BI1 gene to generate transgenic plants with improved disease resistance wherein the expression of the BI1 gene remains essentially unchanged or is reduced in the leaf epidermis of the

transgenic plant while the expression in the mesophyll of the same plant is increased. Because these terms are specifically recited in the claim, they must be considered in determining the patentability of the claim against the prior art, regardless whether the rejection is one of obviousness or one of anticipation. Additionally, the Examiner bears the initial burden to establish a *prima facie* case of obviousness. Thus, the burden is on the Examiner to show that one skilled in the art would expect that the plants expressing BI1 protein in the roots, flowers or seeds tissues as taught in Simmons would also possess essentially unchanged or reduced BI1 expression in leaf epidermis while having BI1 gene overexpressed in the mesophyll of the same plant. Because the Office Action does not identify the basis for such an expectation, it is respectfully submitted that a *prima facie* case of obviousness is not made out.

Moreover, it is well established that under 35 U.S.C. § 103 the Examiner must consider the subject matter sought to be patented as a whole. See MPEP § 2141.02. As part of the "subject matter as a whole" consideration, "a patentable invention may lie in the discovery of the source of a problem even though the remedy may be obvious once the source of the problem is identified. *In re Sponnoble*, 405 F.2d 578, 585, 160 USPQ 237, 243 (CCPA 1969). Thus, where the inventor discovered a cause of problem and there was no teaching in the prior art which would suggest a solution for such a problem, the invention directing to solving that problem is nonobvious and thus patentable. *See id.*

As stated in the specification at page 4, lines 23-29, although constitutive expression of a BI1 protein brings about resistance to necrotrophic fungi, it also surprisingly breaks the mlo-mediated resistance to the obligate-biotrophic powdery mildew. Neither Simmons nor Hückelhoven recognizes such a problem that significantly affects the economical use of the methods taught therein in improving disease resistance in plants. By recognizing the cause of problem, Applicants provide in the present application a novel method in efficiently defending plant pathogens, preferably necrotrophic pathogens, without breaking any other existing resistance to other pathogens, such as biotrophic pathogens, by manipulating the expression level of the BI1 gene in the epidermis and mesophyll of a transgenic plant. Accordingly, it is submitted that the claimed subject matter, as amended, when considered as a whole, is nonobvious over the prior art and thus patentable.

For at least the above reasons and in light of the present amendment, Applicants submit

that Simmons and Hückelhoven, alone or in combination, do not render the claimed subject matter obvious. Reconsideration and withdrawal of the rejection is respectfully requested.

CONCLUSION

For at least the above reasons, Applicants respectfully request withdrawal of the rejections and allowance of the claims. If any outstanding issues remain, the Examiner is invited to telephone the undersigned at the number given below.

Applicants reserve all rights to pursue the non-elected claims and subject matter in one or more divisional applications, if necessary.

This response is filed within three months from the mailing of the Final Office Action mailed December 10, 2008, to and including March 10, 2009. No fee is believed due. However, if a fee is due, the Director is authorized to charge our Deposit Account No. 03-2775, under Order No. 12810-00137-US from which the undersigned is authorized to draw.

Respectfully submitted,

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